DOCUMENT RESUME

ED 469 874 SE 065 849

AUTHOR	Lawrence, Ann
TITLE	Activities To Foster Algebraic Thinking in Middle School.
PUB DATE	2001-03-16
NOTE	7p.; Paper presented at the Annual International Teachers Teaching with Technology Conference (13th, Columbus, OH, March 16-18, 2001).
PUB TYPE	Guides - Classroom - Learner (051) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Algebra; *Graphing Calculators; *Mathematics Activities; Mathematics Instruction; Middle Schools

ABSTRACT

This collection of activities is designed to show how graphics display calculators can be used to foster algebraic thinking in middle school students. The collection consists of five activities addressing such topics as functions, estimation and scatterplots, and patterns. Blackline masters for the activities are included. (MM)

Reproductions supplied by EDRS are the best that can be made
from the original document.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

A. Lawrence

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

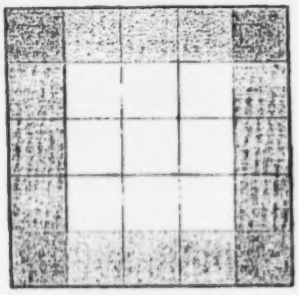
ED 469 874

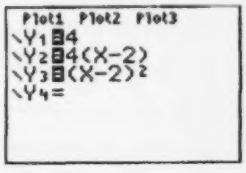
Activities To Foster

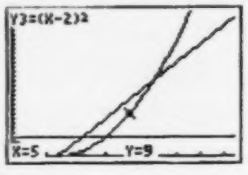
ALGEBRAIC THINKING

in

MIDDLE SCHOOL







T³ International Conference
Columbus, Ohio
March 16, 2001

Ann Lawrence
AnnLTeach@aol.com

BEST COPY AVAILABLE

Amusement Park

Tracy and his friends are going to the amusement park and find that they have two options for buying tickets. With the first option each person could buy an admission ticket for $5.00 and then pay $.25 for each ride. The other option is to buy an admission ticket for $2.00 and then pay $.75 for each ride. What do you think Tracy should do?

Suppose that on Monday Tracy's grandmother gave him $6.00 for the amusement park. Which option should he use? Why?

Suppose that on Wednesday Tracy's uncle gave him $10.00 for the amusement park. Which option should he use? Why?

© C.Hoffman 2000

The Ordinary Man

For use with *The Phantom Tollbooth* by Norton Juster

"You see, to tall men I'm a midget, and to short men I'm a giant; to the skinny ones I'm a fat man, and to the fat ones I'm a thin man." Page 114, *The Phantom Tollbooth*

How much do you and your classmates really observe? How good are you at estimating the heights of famous people? Use this activity to help you explore these questions.

I. Estimate each famous person's height below in inches in the last column.

Name	Actual Height (L_1)	Estimate (L_2)
George W. Bush	_____	_____
William H. Taft	_____	_____
Andre Miller	_____	_____
Marion Jones	_____	_____
Tiger Woods	_____	_____
Britney Spears	_____	_____
Ricky Martin	_____	_____
Oprah Winfrey	_____	_____
Matt Damon	_____	_____
Ken Griffey, Jr.	_____	_____

II. Fill in the actual heights in the middle column.

III. Enter your data into lists in your calculator.

IV. Create a scatter plot to display your data.

V. Observe your results.

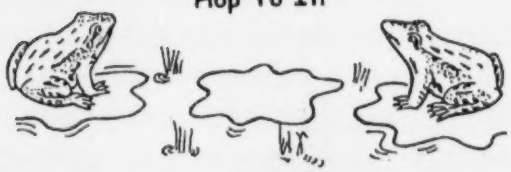
1. How did you do? Use your scatter plot to discuss your results with a classmate.

2. What would the scatter plot look like if you guessed every person's height correctly? Set up a scatter plot to view this information using **Plot 2**. Change the way the calculator displays the information by changing the **Mark** when you set up your plots so that **Plot2** uses a different kind of mark than **Plot1**.

© Ann Lawrence 2000

BEST COPY AVAILABLE

Hop To It!



In this game, frogs change places. At the start, there is always an empty lily pad in the center.

One pair of frogs can change places in three moves

Move 1

Move 2

Move 3

Rules

A frog can either slide to an adjacent square or jump over one other frog to an empty square immediately beyond it.

Frogs facing right can only move to the right. Frogs facing left can only move to the left.

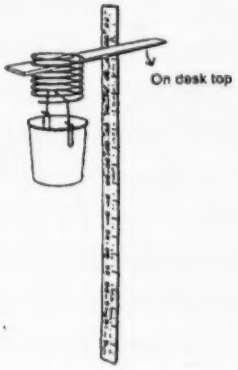
Investigate this game using equal numbers of two different colored frogs.

- What is the smallest number of moves needed to exchange places for 2, 3, 4 pairs of frogs? Make a table and look for patterns.
- How many moves are needed to exchange 10 pairs of frogs? Explain your thinking.
- How many moves are needed to exchange any number of pairs of frogs? Make a rule and explain your thinking.

EXTRA: Investigate using an unequal number of frogs on each side of the empty lily pad. Explain your thinking, including any patterns or rules you find.

Stretching Slinkies

Set up your investigation as shown to the right.



As you set up the equipment, think about the following questions:

1. What will happen to the distance from the bottom of the cup to the floor as you add ten coins (for example. dimes) one at the time to the cup?
2. What will happen to the length of the cup plus the slinky as you add ten coins (for example, dimes) one at a time to the cup?

Choose one of the questions above to investigate. Record your results. Then do the following steps:

- Repeat your investigation with a different type of coin.
- Graph the results of your investigations.

Find a rule for each type of coin you used to predict the length for any number of coins.

© Ann Lawrence 2000

The Window Problem

Peerless Window Company puts together square windows from three kinds of units:

Corner Pane

Center Pane

Edge Pane

They need to decide how many of each kind of unit to make so they can avoid wasting units. Complete the table below. Look for patterns and find a rule for each kind of panes for any size square window.

Window Size	Number of Corner Pane Units	Number of Center Pane Units	Number of Edge Pane Units
2 x 2			
3 x 3			
4 x 4			
5 x 5			
6 x 6			
n x n			

© Ann Lawrence 2000

Ref # SE# 065849

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Activities to Foster Algebraic Thinking in Middle School (from T3 Conference March 2001)	
Author(s): Ann Lawrence	
Corporate Source:	Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) and paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Signature: Ann Lawrence	Printed Name/Position/Title: Ann Lawrence
Organization/Address: 425 8th St NW; Apt # 534 Washington, DC 20004	Telephone: 202-248-1601 FAX:
	E-Mail Address: AnnLTrash@aol.com Date: 10/22/02

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org